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FUTURE CHALLENGES OF ROAD TRANSPORT

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ABSTRACT

The dependency of human towards road transportation is rising in their daily life. Road is currently mode of transportation that is as flexible and functional in the transportation systems. As the scarcity of the land through the increasing for urbanization, at the same time, road transportation faces challenges with the increasing of fuel prices, safety of vehicles, road capacity and the environment issues (Emission). The purpose of this study is to analyze the challenges of the future road transportation through reviewing on the case studies, books, information for website and consultation from expert.

Keywords
Challenges of road transportation, Transport, Fuel prices, Road safety, Road capacity, Vehicle Emissions

1.0 INTRODUCTION

This study focuses on the challenges on road transportation, based on few factors, which include environment issues, road capacity, vehicle safety, and fuel prices. These factors are closely related with our daily life.

The capacity of land is limited, the increasing of the number of human rely on transport cause many problem to the environment. The behavior of human rely on transport will lead to oil crisis. As oil is limited resource, the oil price will increase and the burden on the users will increase.

As a result of the high level of carbon dioxide (CO_2) generated by transportation, these emissions, in particular, are receiving great attention. The amount of vehicle increases as the dependence of human on transportation; also bring to the number of accident cases. Among the main causes of accident includes equipment failure, roadway surfaces, poor maintenance and driver behavior. This drive to the car design focus on safety first, the safety feature according to Used Car Safety Ratings (UCSR), included Crash Avoidance Features, Crash Protection Features, and Driver Features.

The main objective of this research is to identify the future challenges of road transport that relate with environment issue, security of vehicle, fuel prices, and road capacity, and find the best solution in future.

2.0 LITERATURE REVIEW

Nowadays, the capacity of land is limited, the development of human are essential, and the increasing of the number of human rely on road transport causes many problems to the environment, either natural or built. The behavior of human rely on transport will lead to oil crisis. As oil is limited resource, the oil price will increase and the burden on the users will increase. As a result of the high level of carbon dioxide (CO2) generated by transportation through these emissions in particular are receiving great attention.

The amount of vehicle increases as the dependence of human on transportation also raising the accident cases. Among the main causes of accident included equipment failure, roadway surfaces, poor maintenance and driver behavior. This drive to the car design focus on safety first, the safety feature according to Used Car Safety Ratings (UCSR), included Crash Avoidance Features, Crash Protection Features, and Driver Features.

In city level situation is showing similar frightening growth potential, based on Kenworthy (2002) in the USA per capita consumption of energy for private cars is 60,000 MJ (in cities), while in China it is only 2,500 MJ. Only strict policies and regulations have been able to constrain this development; in Hong Kong and Singapore amount of private cars is five to ten times lower compared to cities in Europe and the USA(Cameron *et al*., 2004). But these only due to very unfavorable cost implications of owning and driving private car. Among policies and regulations, careful planning of urban areas and closeness of people living besides each other as well as services, decreases throughout the world traveling by private car (Cameron *et al*., 2003; Karathodorou *et al*., 2010).

Although, being against of private car usage, research has not given that many answers, how and by what manner city-level short-distance public transportation systems should be built. Such issues as number of stop points, round-trip time, routes and operating hours need to be carefully planned to have needed utilization for public transportation system (Lao and Liu, 2009; Karttunen et al., 2010). The most important is Bus-based public transportation system is much cheaper to construct, since typically infrastructure has already been paid by road investments (and in most of the cases by private cars), and, e.g. stations are much easier and cheaper to add in the system.

2.1 Environment Issues (Emission)

Transport is still one of the most serious pollution factors (IPCC, 2007). On the other hand CO_2 emissions of the different transport modes intensify the greenhouse effect (OECD, 2010) resulted the boosted of the costs (Verhoef, 1994). The increasing of vehicles also cause environment problems like sound and air pollution. Environmental management (EM) has become an important topic throughout the last decade. Concepts like corporate social responsibility and sustainable development are frequently discussed. Nevertheless, the issue still remains very complex with disparities in different business branches. Road transport is in this respect still regarded to be one of the main sources of greenhouse gas emission. Thus, it should be an objective of every renowned company to implement a state-of-the-art EM scheme that is adjusted to the business focus and continuously enhanced. However, measures might often be taken only if they have a positive impact on results or the companies' viability. The intrinsic involvement of the management and its commitment is therefore indispensable (Oberhofer, P. & Elmar Fu¨ rst., 2012).

To lower the emission, public are encourage to use public transport if compare to private vehicle, the infrastructure for public transport must be continually improved, this indirectly will solve the land problem.

2.2 Road Transport Safety

Road transport safety is an important issue in the land transport sector, which included safety of transport and people, to reduce accidents and related consequences.

The main types of road transport accidents are:

- Vehicle crashes
- People being struck or run over by moving vehicles (e.g. during reversing or coupling)
- People falling from vehicles
- people struck by objects falling from vehicles, or vehicles overturning

Four factors contribute to the causes of road accident; among them are equipment failure, roadway surfaces, poor maintenance and driver behavior

As the result from the accident that been studied by researchers, vehicle companied, the car designs that determine the safety of road users. They tested from many aspects, for example, the car crash test by The Insurance Institute for Highway Safety (IIHS). It is an independent, nonprofit scientific and educational organization dedicated in reducing the losses, deaths, injuries and property damages, from crashes on the nation's roads.

The Highway Loss Data Institute shares and supports this mission through scientific studies of insurance data. It represents the human and economic losses resulted from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle manufacturer and model.

Based on the Safety Features information shows by Used Car Safety Ratings (UCSR), in a crash situation, different cars offer varying levels of occupant protection. Car manufacturers can include different combinations of features which impact on the safety. These safety features are generally grouped into three categories:

- Crash Avoidance Features
  Features that avoid crashes such as electronic stability control (ESC), anti-lock braking systems (ABS) and traction control.

- Crash Protection Features
  Features that help to protect in a crash, such as seat belts, curtain airbags and car crumple zones

- Driver Features
  Features that add to the safety in making driving easier and more comfortable, such as seat height adjustment

Driver and passenger protection depends on the car's structures, drivers, passenger restraints and related protection devices working together as an integrated system.

Essential safety features includes

- A strong cabin that can withstand severe impacts
- Crumple zones outside the cabin to absorb the forces exerted in a car crash
- Effective restraint of drivers and passengers to reduce the likelihood of injury from interior features of the car. It also prevents

the ejection from the car and to reduce the potential for soft tissue injury such as whiplash

The further information decisions about how well different cars will protect in a crash and how manufacturers have integrated safety features by referring to the Used Car Safety Ratings (UCSR).

2.3 Price of Fuel

The price of fuel will affect the behavior of public as to take private vehicle or public transport. Based on the research do by Zhuo Li; Hui Zhao (2011). Since the 1970s of the twentieth century, the international crude oil price has been going up and down, showing daily volatile oscillation as well as several clear-cut rising and falling segments.

Relation between prices of crude oil and fuel prices

Retail car fuel prices typically follow wholesale prices which, in turn, are driven by crude oil prices, the reason for us to pay high attention, as the increases of car fuel price affect many consumers, especially during economic recession. The difficult part of the relationship is to identify when the change in retail car fuel prices takes place with regards to the change in crude oil price and also the degree to which the retail price changes with regards to the change in crude oil prices, i.e. ascertain if there is price asymmetry. The notion that motor fuel prices react quickly to oil price increases and slowly to oil price reductions is largely accepted among car owners and transport operators. The levels recently hit by oil and motor fuel prices and the present uncertainty in supply and reserve availability have contributed to reinvigorate the interest in the asymmetric transmission of changes in the price of oil to the price of motor fuel.

2.4 Road Capacity

Capacity of land is facing the big challenges; especially expansion land use for road transportation has led to a massive consumption of space with 1.5 to 2.0% of the world's total land surface devoted to the automobile and mainly for roads and parking lots. The capacity of land unable to support for a vast transport system, the dependence on transportation has reached a point where 30 to 60% of urban areas are taken by road transportation infrastructure alone. This phenomenon are obvious among developed countries, developing countries and backward countries, for example, developed countries like Los Angeles, this figure can reach 70%. Yet, for many developing countries such as China and India, motorization is still in its early stages. For China to have a level of motorization similar to those of Western Europe would imply a fleet of vehicle superior to the current global fleet.

From a land requirement perspective, motorization would thus be a technical impossibility. The size of cities takes large quantities of land and their growth lead to the notion of metropolitan areas and, urban regions oriented along corridors. With urbanization, the expansion of transportation has allowed the reclamation of vast amounts of land from rural activities towards other usage. Also, the duplication and generalization of infrastructure, public and private alike, have resulted in supplementary land requirements. This is notably the case for large transport terminals such as ports and airports where several were built because they belonged to different administrative jurisdictions. The general aim was to convey a high level of accessibility to answer mobility demand of vast areas. While in several regions road transportation infrastructures are overused, a situation of over-capacity exists in others. The formation of compact and accessible cities must be allowed to contend with the already existing built environment while considering several limits to development and urban renewal through temporal constraints and common limitations in capital availability (Rodrigue, 2009).

3.0 METHODOLOGY

The purpose of this study is to establish on the challenges of road transportation through factors, which include environment issues, road capacity, vehicle safety, and price of oil, the variable that will bring to the changes for road users behavior.

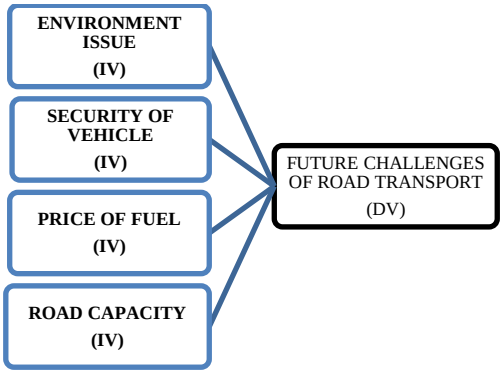
The research is accomplished by referring to researcher's proposal, the government organization, and non-government organization. This article is qualitative base; the data for the research is referring to:

- The world bank
  - Global population and CO_2 emissions
- Department of Road Transport Malaysia
  - Cumulative number of drivers, cars and motorcycles, Malaysia, 2005-2009
  - Number of accidents, Malaysia, 2005-2009
  - Types of accident
  - Types of injury accidents, Malaysia, 2005-2009
  - Number of accidents by types of vehicles, Malaysia, 2005-2009
  - Number of traffic and highway accidents, Malaysia, 2004-2008
- Malaysia Institute of Road Safety Research (MIROS)
  - General Road Accident Data in Malaysia (1995 – 2010)

- U.S. Energy Information Administration
  - Crude oil price movement (unit: US$/barrel)

4.0 FINDING

The challenges of road transport are the environment issues, security of vehicle, price of oil and road capacity.



The research from European Road Transport Research Advisory Council on title ERTRAC Road Transport Scenario 2030+ "Road to Implementation" also had been review for the challenges of road transportation.

The details of the report can be reviewed from:

ERTRAC Road Transport Scenario 2030+: "Road to Implementation". (2009). *European Road Transport Research Advisory Council*, (pp. 1-97).

This report has been used to support the statement and challenges on road transportation.

4.1 Air Quality

Population living and working close to major transport infrastructure may be at risk due to increased levels of air pollution and noise. A first assessment shows that approximately 9 per cent of the EU population will live closer than 200 meters from a major road carrying more than 3 million vehicles per year, and as many as 25 per cent of the EU population will live closer than 500 meters from such a road. Hence, there will be a small increase in population exposed to air pollution from road traffic, except for those living very close to major roadways.

Public policy in this area has focused on improving air quality by controlling emissions of harmful substances into the atmosphere, by improving vehicle emissions performance, and by integrating environmental protection requirements into the transport and energy sectors. Examples are Directive 98/69/EC on air pollution by emissions from motor vehicles and Regulation (EC) No. 443/2009 on emission performance standards for new passenger cars.

For light-duty vehicles, the current emission standard is Euro 4, as defined by Directive 98/70/EC. Following the Clean Air for Europe (CAFE) program and the resulting Thematic Strategy on Air Pollution (TSAP), new vehicle emissions standards have already been agreed by Council and Parliament and the Euro 5 vehicle emissions standard for light-duty vehicles will be introduced this year.

4.2 Land use

More than 80 per cent of the EU's 377 million citizens live in cities and towns and, on average, 117.5 people live on each of the EU's 3 million square kilometers. This makes land-use planning and management an important environmental and land development issue. Land use can have major impacts on environmental conditions including the loss of natural habitats and landscapes or increased air pollution and GHG due to higher traffic levels. Although land-use planning and management decisions are usually made at local or regional level, the EC plays a role by ensuring that Member States take environmental concerns into account when putting together their land-use development plans. One of the Commission goals in this area is the development and implementation of a European urban environment strategy to develop a sustainable and integrated approach to urban development and management together with the improvement of the natural systems.

4.3 Biofuels And Renewable Energy

Energy consumption in the transport sector depends almost exclusively on imported fossil fuels, mainly crude oil. The transport sector is forecast to grow more rapidly than any other sector up to 2020 and beyond and will remain crucial to the functioning of the European economy. The importance and the vulnerability of the transport sector require that action is taken to improve sustainability and reduce its demand on Europe's energy supply.

Under Directive 2009/28/EC (Renewable Energy Directive), a firm target has been set for increasing the share of renewable energy in transport fuels to a minimum of 10 per cent (on an energy basis) by 2020. The greater use of renewable fuels is expected to reduce GHG emissions and have no negative impact on biodiversity and land use. Implementation issues on these topics will be resolved in 2009.

5.0 DISCUSSION AND CONCLUSION

To effectively reduce solve the problem of limited capacity of land and the increasing price of oil that also increase the burden on road user, public are encourage to use public transport as their main transportation, by doing this the vehicle emissions able to be reduce.

This will study by journal title Benchmarking efficiency of public passenger transport in larger cities (Hilmola, O.-P., 2011). This case study is to evaluate public transportation efficiency in larger cities. Global agreements to decrease environmental emissions in the future (CO2), world-wide decreasing reserves of oil, and growing population in larger cities is the main motivation to develop efficiency benchmarking measurement models for public transportation systems.

Typically public passenger transport is significantly dependent on the amount of potential users in its sphere of influence (Lao and Liu, 2009; Karathodorou et al., 2010; Karttunen *et al*., 2010), and therefore it is not surprise that mega-cities (Jain et al., 2008) or larger entities. Public transportation is only increasing its importance, due to continuing urbanization and for the need to connect suburbs and regions into centers (Qin, 2008).

Among this, increasing environmental pressure from road transports (CO2 emissions), road transports' very significant dependency on oil (especially private cars; Sandalow, 2008), and estimated decline in oil availability in the world scale (Maggio and Cacciola, 2009) are all increasing the reasons to investigate the efficiencies of public short-distance passenger transportation systems. This is particularly concern in larger cities, and population concentration centers of prospering emerging economies (Kenworthy, 2002; Hu et al., 2009); frightening scenario is that these emerging cities will adapt to use within large-scale private cars by following the examples of West (Cameron et al., 2003, 2004).

It should be highlighted that transportation in general has nothing but increased its CO2 emissions within previous two decades time period (generally in other sectors contrarian development has been reached) – for example, even in EU (2010), which has showed proactive role in emission prevention, have recorded 30 per cent increases from year 1990 levels. In general, increased emissions are caused by road transportation and aviation.

Major concern of larger cities, but also countries within passenger transport, is the increasing popularity of private car-based road transports. For example, if China does not bother to do nothing with this respect, then in year 2030 it will have 400 million passenger cars on roads, hungry for gasoline (Hu *et al*., 2009).

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